

*Peterson 18**Serial No. 09/915,963*

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8 wherein the at least one antenna element comprises a traveling wave antenna supporting a
9 phase velocity greater than the speed of light and, wherein the antenna structure supports
10 a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional
11 three-dimensional beam pattern.

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2 5. (Previously Presented) The antenna structure of Claims 3 or 4, wherein the
at least one antenna element is positioned at an angle from the symmetrical ground plane.

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2 6. (Original) The antenna structure of Claim 5, wherein the angle is about 90
degrees with respect to the x-, y- and z- axes.

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2 7. (Previously Presented) The antenna structure of Claims 3 or 4, wherein the
at least one antenna element is coupled with the symmetrical ground plane by means of an
3 unbalanced impedance.

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2 8. (Original) The antenna structure of Claim 7, wherein the unbalanced
impedance comprises a coaxial cable.

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2 9. (Original) The antenna structure of Claim 7, wherein a first conductor of
the unbalanced impedance mechanically couples the at least one antenna element with the
3 symmetrical ground plane.

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1 **10. (Previously Presented)** The antenna structure of Claims 3 or 4, wherein the
2 symmetrical ground plane is disk shaped.

1 11. (Canceled)

1 **12. (Canceled)**

13. (Currently Amended) An antenna structure comprising:

an array of at least two antenna elements, each antenna element having at least one taper;

a symmetrical finite ground plane;

and

an unbalanced impedance for coupling the array of at least two antenna elements with the symmetrical ground plane;

wherein at least one antenna element of the array comprises a traveling wave antenna supporting a phase velocity greater than the speed of light and wherein the taper of at least one antenna element of the array comprises a linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile.

1 **14. (Currently Amended) An antenna structure comprising:**

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3 an array of at least two antenna elements, each antenna element having at least one
4 taper;

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6 a symmetrical finite ground plane;

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8 and

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10 an unbalanced impedance for coupling the array of at least two antenna elements
11 with the symmetrical ground plane;

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13 wherein at least one antenna element of the array comprises a traveling wave antenna
14 supporting a phase velocity greater than the speed of light and wherein each antenna
15 element of the array supports a cigar-like directional three-dimensional beam pattern and a
16 butterfly wing-like directional three-dimensional beam pattern.

1 15. (Previously Presented) The antenna structure of Claims 13 or 14, wherein
2 each antenna element of the array is positioned at an angle from the symmetrical ground
3 plane.

1 16. (Original) The antenna structure of Claim 15, wherein the angle for each
2 antenna element is about 90 degrees with respect to the x-, y- and z- axes.

1 17. (Previously Presented) The antenna structure of Claims 13 or 14, wherein
2 the unbalanced impedance comprises a coaxial cable.

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1 **18.** (Original) The antenna structure of Claim 17, wherein a first conductor of
2 the unbalanced impedance mechanically couples each antenna element of the array with
3 the symmetrical ground plane.

1 **19.** (Previously Presented) The antenna structure of Claims 13 or 14, wherein
2 the symmetrical ground plane is disk shaped.

1 **20.** (Previously Presented) The antenna structure of Claims 13 or 14, further
2 comprising a slow wave antenna to widen the directivity of the antenna structure.

1 **21.** (Canceled)

1 **22.** (Currently Amended) An apparatus comprising:

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3 a transceiver; and

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5 an antenna structure for radiating or capturing electromagnetic energy from or to
6 the transceiver comprising:

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8 at least one antenna element having at least one taper, the taper comprising
9 a linear profile, a linear constant profile, a broken-linear profile, an
10 exponential profile, an exponential constant profile, a tangential profile, a
11 step-constant profile, or a parabolic profile;

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13 a symmetrical disk shaped finite ground plane, the at least one antenna element
14 being positioned at an angle from the symmetrical disk shaped finite ground plane;

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15 |
16 | and
17 |
18 | an unbalanced impedance for coupling the at least one antenna element
19 | with the symmetrical disk shaped finite ground plane;
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21 | wherein the at least one antenna element comprises a traveling wave antenna supporting a
22 | phase velocity greater than the speed of light and wherein the at least one antenna element
23 | supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like
24 | directional three- dimensional beam pattern.

1 **23.** (Previously Presented) The antenna structure of Claim 22, wherein the
2 angle is about 90 degrees with respect to the x-, y- and z- axes.

1 **24.** (Previously Presented) The antenna structure of Claim 22, wherein the
2 unbalanced impedance comprises a coaxial cable.

1 **25.** (Previously Presented) The antenna structure of Claim 22, wherein a first
2 conductor of the unbalanced impedance mechanically couples the at least one antenna
3 element with the symmetrical ground plane.

1 **26.** (New) The antenna structure of Claim 20, wherein said slow wave antenna
2 is positioned at a greater distance from said ground plane than said antenna elements.

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1 **27.** (New) The antenna structure of Claim **3, 4 or 22**, wherein the distance
2 between the lower edge of said at least one antenna element and said ground plane is
3 tapered.

1 **28.** (New) The antenna structure of Claim **13 or 14**, wherein the distance
2 between the lower edge of each of said at least two antenna elements and said ground
3 plane is tapered.